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ATTORNEYS AT LAW

Docket No.: 241912US0X

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

RE: Application Serial No.: 10/645,533
Applicants: Hironobu SHINOHARA
Filing Date: August 22, 2003
For: CONDUCTIVE POLYMER FILM AND POLARIZING PLATE USING THE SAME
Group Art Unit: 1773
Examiner: ZACHARIA, Ramsey E.

SIR:

Attached hereto for filing are the following papers:

Appeal Brief w/ Claims Appendix

Our credit card payment form in the amount of **$500.00** is attached covering any required fees. In the event any variance exists between the amount enclosed and the Patent Office charges for filing the above-noted documents, including any fees required under 37 C.F.R 1.136 for any necessary Extension of Time to make the filing of the attached documents timely, please charge or credit the difference to our Deposit Account No. 15-0030. Further, if these papers are not considered timely filed, then a petition is hereby made under 37 C.F.R. 1.136 for the necessary extension of time. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

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DOCKET NO: 241912US0X

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :

HIRONOBU SHINOHARA : EXAMINER: ZACHARIA, RAMSEY E.

SERIAL NO: 10/645,533 :

FILED: AUGUST 22, 2003 : GROUP ART UNIT: 1773

FOR: CONDUCTIVE POLYMER FILM AND POLARIZING PLATE USING THE SAME

APPEAL BRIEF

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

This is an appeal from the second non-Final Rejection of the claims dated April 14, 2005.

I. REAL PARTIES IN INTEREST

The real parties in interest are JSR Corporation, Tokyo, Japan and HS Planning Limited, Tokyo, Japan, by virtue of the assignment recorded April 6, 2004, at Reel/Frame 015183/0836.

II. RELATED APPEALS AND INTERFERENCES

Appellants, Appellants' legal representative and their assignee are not aware of any other appeals, interferences or judicial proceedings which will directly affect or be directly affected by or having a bearing on the Board's decision in this appeal.

III. STATUS OF THE CLAIMS

The status of each claim in the present application is listed below:

Claims 10-20 are canceled.

Claims 1-9 and 21-22 are pending and rejected.

Thus, the appealed claims are Claims 1-9 and 21-22. The text of those claims is provided in the Claims Appendix.

IV. STATUS OF AMENDMENTS

No amendments have been filed subsequent to the Office Action mailed on April 14, 2005.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

As recited in sole independent Claim 1, the present invention relates to a protective film for a polarizing plate comprising:

a polymer film (page 3, lines 6-7) and

a conductive polymer adhered to the surface thereof (page 3, lines 6-7),

wherein the conductive polymer comprises polythiophene or polythiophene derivatives (page 3, lines 9-10 and page 3, lines 15-16),

the polymer film comprises an acetyl cellulose material or a norbornene material (page 3, lines 11-12),

a layer of the conductive polymer has a thickness of 3 μm or less (page 3, line 11), and the conductive polymer film has a visible light transmission of 78% or more and a surface resistivity of 10^3 - 10^{12} Ω/square (page 3, lines 8-9).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

(1) Whether Claims 1-9 and 22 are unpatentable under 35 U.S.C. §103(a) over Fujimaki et al. (hereafter "Fujimaki," U.S. Patent No. 6,191,837) in view of Bennett (U.S. Patent No. 4,674,840).

(2) Whether Claims 1-9 and 22 are unpatentable under 35 U.S.C. §103(a) over Fujimaki in view of Hani et al. (hereafter "Hani," U.S. Patent No. 5,334,424).

(3) Whether Claim 21 is unpatentable under 35 U.S.C. §103(a) over Fujimaki in view of Hani, and further in view of Babinec et al. (hereafter "Babinec," U.S. Patent No. 6,203,727).

(4) Whether Claim 21 is unpatentable under 35 U.S.C. §103(a) over Fujimaki in view of Bennett, and further in view of Babinec.

(5) Whether Claim 21 is unpatentable under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement.

VII. ARGUMENT

The rejections under 35 U.S.C. § 103(a) as unpatentable of:

Claims 1-9 and 22 over Fujimaki in view of Bennett;

Claims 1-9 and 22 over Fujimaki in view of Hani;

Claim 21 over Fujimaki in view of Hani, and further in view of Babinec;

Claim 21 over Fujimaki in view of Bennett, and further in view of Babinec; and

the rejection of Claim 21 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement

are all respectfully traversed.

It is known to have at least one polarizing plate associated with a liquid crystal display. Polarizing plates are known to contain a polarizing film containing iodine- or dye-treated, stretched, polyvinyl alcohol (PVA) film, in which a film comprising triacetyl cellulose (TAC) is adhered to both sides of the polarizing film. The TAC film serves to strengthen the polarizing film, and also protects the polarizing film from water absorption. Since TAC films easily adheres to the polarizing film, has excellent transparency, and small birefringence, TAC films have been commonly employed as a protective film for a polarizing film containing PVA (see page 1, lines 15-21 of the present Specification).

However, it has been found that as the liquid crystal display size has increased, TAC films may be limited in their ability to protect the polarizing film from water absorption. Accordingly, some investigations have focused on employing a norbornene material as an alternative to TAC, since the norbornene material is also known to possess excellent

transparency, small birefringence, and small water absorptivity (see page 1, line 22 – page 2, line 2 of the present Specification).

It is also recognized that a liquid crystal display emits electromagnetic waves that may adversely affect the human body. Therefore, it is desirable to fit a liquid crystal display with a protective film in order to shield the consumer from these potentially adverse electromagnetic waves. Whether the protective film is situated in the interior or on the exterior of the liquid crystal display, the protective film is required to have excellent transparency, small birefringence, high strength, high heat resistance, and low water absorption (see page 2, lines 3-10 of the present Specification).

The consumer can be shielded from the potentially adverse electromagnetic waves by a conductive layer that is provided on the front (or viewing side) of the liquid crystal display. An indium-tin oxide material can be adhered to a polymer film in order to provide a conductive layer on the front of the liquid crystal display, by means of a sputtering or other deposition process. However, these processes are difficult to achieve and thereby reduce productivity of a manufacturing process. Moreover, the indium-tin oxide material is relatively expensive, and has a tendency to have a yellow color. The yellow color of the indium-tin oxide material is problematic in the application of color liquid crystal displays (see page 2, lines 11-20 of the present Specification).

Another issue of concern involving liquid crystal displays is the ever-present problem of dust. Under normal operating conditions of a liquid crystal display, current leakage from the interior to the exterior of the display gives rise to a build-up of static electricity on the surface of the display. Accordingly, it is desirable to employ a material on or near the surface of the liquid crystal display that is capable of dissipating static electricity build-up that naturally occurs during normal operation of these displays. The potential conductive

polymeric materials that are available to address this issue are derivatives of polyaniline, polypyrrole, and polythiophene (see page 2, lines 18-24).

Accordingly, there is a need to have a *protective* film for a polarizing plate that is capable of shielding potentially adverse electromagnetic waves (page 2, ¶ 1), is not or does not turn yellow under normal liquid crystal display operating conditions (page 2, ¶ 2), and has antistatic properties in order to reduce the accumulation of dust on the surface of the liquid crystal display (page 2, ¶ 3). However, the conventionally known protective films for polarizing plates do not satisfy all of these requirements.

This is in contrast to the protective film for a polarizing plate, as claimed in Claim 1, which comprises a polymer film and a conductive polymer adhered to the surface thereof, which does satisfy all of the above-noted requirements, as can seen from the data tabulated in the present Specification. In this regard, Appellants direct the Board's attention to the data tabulated in Tables 1-3 showing data of embodiments of the protective film having characteristics of surface resistivity, yellowness, total solar energy transmission, and birefringence, which are within desireable limits. For convenience the data shown in Tables 1-3 of the present specification are combined and presented in the Table on the following page.

The significance of some of the limitations of Claim 1 can be appreciated from the following information that has been culled from the present Specification.

Firstly, page 11, lines 1-4 of the present Specification highlights the importance of the conductive polymer layer thickness limitation of 3 μm or less. For instance, if "the thickness [of the conductive polymer layer] is too small, a sufficient antistatic effect may not be obtained," and if "the thickness [of the conductive polymer layer] is too large, the coating film may crack or [an] anti-blocking property may deteriorate."

TABLES 1-3 (combined)

	E1	E2	E3	E4	E5	E6	E7	CE1	CE2	CE3	CE4	CE5	CE6	CE7
Film	TAC	TAC	TAC	TAC	ARTON	ARTON	ZENOR	TAC	TAC	ARTON	ARTON	ZENOR	TAC	TAC
CPLT (μm)	0.11	0.12	0.12	1.2	0.10	0.11	0.12	None	None	None	None	None	0.10	0.10
SR (Ω/square)	8×10^5	7×10^5	4×10^9	6×10^4	2×10^6	7×10^5	6×10^5	$>10^{14}$	$>10^{14}$	$>10^{14}$	$>10^{14}$	$>10^{14}$	1×10^5	10^8
Yellowness b*	0.25	0.50	0.35	0.17	0.30	0.55	0.77	0.40	0.65	0.45	0.71	0.93	---	---
TSET (%)	92.1	91.3	92.3	90.0	92.7	92.0	91.5	92.3	91.4	92.6	92.2	91.9	75	50
Birefringence (nm)	10	11	10	12	15	16	17	10	12	16	17	19	10	10
Haze (%)	---	25.9	---	---	---	26.6	25.3	---	27.1	---	27.3	26.4	---	---
60° AL (%)	---	34.3	---	---	---	35.1	34.7	---	34.0	---	35.0	34.5	---	---

Abbreviations:

TAC: Film comprising triacetyl cellulose (see page 1, line 17 of the Specification)
ARTON/ZENOR: Film comprising norbornene (see page 9, lines 6-15 of the Specification)
CPLT: Conductive Polymer Layer Thickness.
SR: Surface resistivity.
TSET: Total solar energy transmission.
60° AL: 60° angle luster.

Secondly, page 8, lines 13-22 of the present Specification shows the importance of the conductive polymer film having a visible light transmission of 78% or more. Clearly, if a protective layer is to be applied to a surface on the viewing side of the display, it is important to have an optimal visible light transmission – this is especially true for color liquid crystal displays. As noted above, conventional protective films for polarizing plates employ an indium-tin oxide material that has a yellowish-tinge. This is unacceptable for color liquid crystal displays. While both polyaniline and polypyrrole conductive polymers are known, under comparable conditions only polythiophene achieves the desired optical characteristics. The Board is asked to inspect the text on page 2, lines 23-24 of the present Specification in conjunction with the data shown for Comparative Examples 6-7. As noted in the text, both polyaniline and polypyrrole are unacceptable because the former is green while the latter is gray. This manifests in lower than acceptable visible light transmission values for films containing TAC and polyaniline (CE 6, TSET: 75%) or polypyrrole (CE 7, TSET: 50%).

Thirdly, the importance of a conductive polymer film having a surface resistivity of $10^3 - 10^{12}$ Ω/square is revealed on page 6, lines 4-12 of the present Specification. For instance, if "the surface resistivity is less than 10^3 Ω/square, it is necessary to increase the thickness of the coating" (page 6, lines 8-10), but it is disclosed that if the coating "thickness is too large, the coating film may crack or [the] anti-blocking property may deteriorate" (page 11, lines 2-3). Furthermore, "if the surface resistivity exceeds 10^{12} Ω/square, [the] antistatic effect or electromagnetic wave shielding effect becomes sufficient" (page 6, lines 10-12).

Fourthly, the importance of having a conductive polymer that comprises polythiophene or a polythiophene derivatives is noted above, and disclosed on page 2, lines 21-24 of the present Specification. The Board's attention is once again directed to the total solar energy transmission values obtained for conductive polymer films containing either polyaniline (CE 6) or polypyrrole (CE 7).

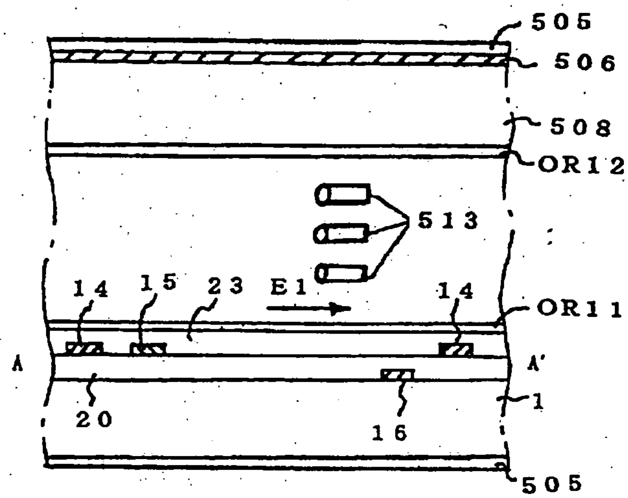
Nowhere in any conceivable combination of Fujimaki, Bennett, Hani, and Babinec is there a suggestion of having a protective film for a polarizing plate that comprises a polymer film and a conductive polymer adhered to the surface thereof. The Board is asked to recognize that Claim 1 is directed to a protective film for a polarizing plate. As noted above, the polarizing plate should be protected from water, residual static electricity, and the consumer should be protected from potentially adverse electromagnetic waves, while adhering to the limitations of Claim 1 (see pages 1-2 of the present Specification).

It may be true that Fujimaki discloses a liquid crystal display having an organic conductive layer, in order to prevent a deterioration of display quality (i.e., deterioration of liquid crystal substance) due to static electricity from the externals (see Abstract, lines 16-21).

Specifically, Fujimaki discloses a liquid crystal display having an organic conductive layer, a polarizing plate, and a transparent substrate. The organic conductive layer contains one of three substances (col. 6, lines 40-50), one of which may include a polythiophene derivative (see col. 6, formula (1)). The polarizing plate includes "laminated triacetate substrates having a polarizing element in the core thereof" (col. 13, lines 10-11, lines 39-40, lines 55-56 and col. 14, lines 3-5). The transparent substrate is made of glass (see col. 10, line 46; col. 12, line 15; and col. 12, line 33). The electroconductive film generally has a thickness of from 100 Å unit to 1 μm (col. 11, lines 23-25), as well as a surface resistivity of about 100 kΩ/square (col. 10, lines 8-11).

The organic conductive layer **506** is disposed between a transparent substrate **508** and a polarizing plate **505** (see Fig. 1(b), reproduced below). Alternatively, the polarizing plate **505** is disposed between a transparent substrate **508** and the organic conductive layer **506** (see Fig. 2, reproduced below).

Fig. 1(b)



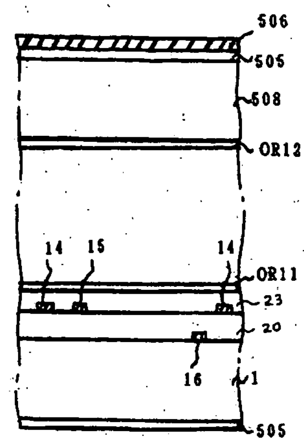
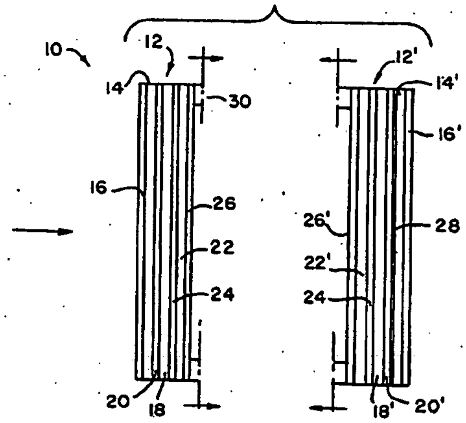


Fig. 2

Furthermore, it may also be true that Bennett discloses a laminated assembly that includes a polymer used for a transparent substrate and a transparent conductive layer (see Fig. 2 and col. 3, lines 40). However, the conductive layer works as a general driving electrode. Bennett does not disclose polythiophene at all.

Specifically, Bennett discloses a liquid crystal display with a polarizer and biaxial birefringent support (see Abstract). The liquid crystal display contains laminated assemblies of polymeric films **12** and **12'** (see Fig. 2 of Bennett, reproduced below, where the arrow represents the viewing side). Inspection of Fig. 2 of Bennett shows that the laminated films contain (from the exterior to the interior): a protective layer **16** (col. 3, lines 38-47), a transparent substrate **14** (col. 3, lines 4-17), a transparent adhesive layer **20** (col. 3, lines 50-51), a polarizing layer **18** (col. 3, lines 48-59), a transparent conductive layer **24** (col. 4, lines 16-31), a transparent protective layer **22** (col. 4, lines 32ff), and an alignment layer **26** (col. 5, lines 33ff). A seal **30** connects the two assemblies (**12** and **12'**) in order to contain the liquid crystal substance. It may be true that Bennett discloses that the transparent substrate **14** may include a polymeric film that has cellulose acetate material (see col. 3, lines 17, see elements **14** and **14'** of Fig. 2 reproduced below).

FIG. 2.



Hani discloses that a transparent electrode is formed on a liquid crystal substrate comprising a norbornene resin (col. 5, line 60 – col. 6, line 22). The transparent electrode can be made from films of metals, films of semiconductors and oxide semiconductors, multilayer films, films of electrolytes, or films of electroconductive polymers, in which polythiophene, along with polyaniline and polypyrrole, are examples of electroconductive polymers employed in the *transparent electrode*. It is noted that the transparent electrode layer disclosed in Hani works as a general driving electrode.

Babinec discloses that organic conductive polymers (col. 2, lines 56-60) may doped with at least two different dopants (see Abstract). Babinec does not disclose polarizing plates and protective films thereof. Babinec is cited to show that it is known to have a film containing polythiophene and a polystyrene sulfonic acid (see Example 5 at col. 19, lines 21ff).

In view of these disclosures, the Office has taken the position that since Fujimaki discloses adhering an organic conductive layer to a transparent substrate, and since Bennett discloses that a transparent substrate that can be a polymer including acetyl cellulose, and

since Hani discloses that norbornene can be used as a transparent substrate, then it would have been *prima facie* obvious to arrive at the present invention.

Babinec is not relevant to the issue of functional equivalence.

The Office's position is based on functional equivalence of the transparent substrates (see page 8 of Office Action dated April 14, 2005). However, the Board is asked to inspect Figs. 1(b) and 2 of Fujimaki, when viewed in light of the disclosures of Bennett and Hani. In particular, attention is directed to the positioning of the polarizing plate **505** relative to the organic conductive layer **506** (see Fujimaki, Figs. 1(b) and 2).

In the embodiment shown in Fig. 2 of Fujimaki, the organic conductive layer **506** does not contact the transparent substrate **508**. Since Claim 1 clearly requires that the conductive polymer is adhered to the surface of the polymer film, then it is believed that there is no suggestion to be gleaned from this embodiment.

In the embodiment shown in Fig. 1(b), the polarizing plate **505** contacts the organic conductive layer **506**, which in turn contacts the transparent substrate **508**. It appears that the Office has taken the position that since the organic conductive layer **506** contacts the transparent substrate **508** and that since a film containing either acetyl cellulose or norbornene is believed to be functionally equivalent to glass, then the claimed *protective film* would have been obvious over Fujimaki in view of Bennett or Hani. While it is conceivable that this arrangement can afford anti-static protection to the liquid crystal display, how can this arrangement protect the polarizing plate against water absorption? It cannot. Appellants note that the Office's proposed modification of the combined disclosures would in fact render the claimed protective film inoperable when viewed in light of its intended purpose.

Appellants note that the present invention is directed to a protective film for a polarizing plate. Regarding the cited references, Fujimaki is concerned with a polarizing plate itself, and Hani and Bennett are concerned with a liquid crystal substrate and the

substrate having formed thereon a conductive electrode. Thus, the usages of the present invention and the cited references are quite different.

The reason of formation of polythiophene layer in Fujimaki is to prevent a product after fabricating a liquid crystal from deterioration of the ***liquid crystal*** (not the polarizing plate) due to retention of static electricity.

Hani and Bennett merely disclose examples of a general transparent electrode.

Accordingly, Appellants believe that the proposed modification of Fujimaki by application of any one of Bennett, Hani, and Babinec is beyond the intended purpose of disclosed by Fujimaki. Accordingly, it is believed that the Office has failed to establish a *prima facie* case of obviousness.

In the issue of the rejection of Claim 21 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement, Appellants respectfully note that a dopant is disclosed on page 5, lines 10-20. These dopants may be used alone or as mixtures of two or more (page 5, line 20). Appellants that a polystyrene comprising sulfur is adequately supported in this passage.

In view of the foregoing, all of the rejections of claims 1-9 and 21-22 discussed above should be REVERSED.

Respectfully submitted,

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CLAIMS APPENDIX

The appealed claims read as follows:

1. A protective film for a polarizing plate comprising a polymer film and a conductive polymer adhered to the surface thereof, wherein the conductive polymer comprises polythiophene or polythiophene derivatives, the polymer film comprises an acetyl cellulose material or a norbornene material, a layer of the conductive polymer has a thickness of 3 μm or less, and the conductive polymer film has a visible light transmission of 78% or more and a surface resistivity of 10^3 - 10^{12} Ω/square.

2. The protective film for a polarizing plate as claimed in claim 1, wherein the conductive polymer layer further comprises a binder resin.

3. The protective film for a polarizing plate as claimed in claim 1, wherein the conductive polymer layer further comprises a dopant.

4. The protective film for a polarizing plate as claimed in claim 1, further comprising a hardcoat layer.

5. A polarizing plate comprising a polarizing film and the protective film as claimed in claim 1 as a protective film formed on at least one side of the polarizing film.

6. The protective film for a polarizing plate as claimed in claim 1, wherein the conductive polymer film has a surface resistivity of 10^4 - 10^8 Ω/square.

7. The protective film for a polarizing plate film as claimed in claim 1, wherein the layer of the conductive polymer has a thickness of 0.005 – 3 μm.

8. The protective film for a polarizing plate film as claimed in claim 1, wherein the layer of the conductive polymer has a thickness of 0.01 – 1 μm.

9. The protective film for a polarizing plate film as claimed in claim 1, wherein the layer of the conductive polymer has a thickness of 0.02 – 0.5 μm.

21. The protective film for a polarizing plate as claimed in claim 3, wherein the dopant is a polystyrene comprising sulfur.

22. The protective film for a polarizing plate as claimed in claim 1, further comprising an antiglare hardcoat layer.